

Customer No.: 31561
Application No.: 10/709,055
Docket No.: 12404-US-PA

REMARKS

Present Status of the Application

This is a full and timely response to the outstanding non-final Office Action mailed on February 26, 2006. The Office Action maintains the rejections to claims 1-5 and 12 under 35 U.S.C. 103(a), as being unpatentable over Yamazaki et al. (USPAP 2002/0004292, hereinafter Yamazaki) in view of Tanabe et al. (USPN 6,861,614, hereinafter Tanabe), and to claims 6-11 and 13-17 under 35 U.S.C. 103(a) as being unpatentable over Yamazaki and Tanabe in view of Jung (USPN 6,825,493, hereinafter Jung). Upon entry of this response, claims 1-17 remain pending.

Applicant has most respectfully considered the remarks set forth in this Office Action. Regarding the obviousness rejections, it is however strongly believed that the cited references are deficient to adequately teach the claimed features as recited in the currently pending claims. The reasons that motivate the above position of the Applicant are discussed in detail hereafter, upon which reconsideration of the claims is most earnestly solicited.

Discussion of Office Action Rejections

The Office Action has rejected claims 1-5 and 12 being unpatentable over Yamazaki in view of Tanabe. Applicants respectfully traverse the rejection for at least the following reasons.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the

Customer No.: 31561
Application No.: 10/709,055
Docket No.: 12404-US-PA

knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. See MPEP § 2143.

Applicants respectfully submits that the Office has failed to establish the prima facie obviousness in rejecting independent Claims 1 and 13 because Yamazaki and Tanabe, taken alone or combined, fails to teach or suggest, among other things, an apparatus for laser annealing an amorphous silicon film comprising "a first photomask disposed on an optical path of said first laser beam and in front of said amorphous silicon film, the first photomask comprising a first pattern having a transparent region and a non-transparent region and a second photomask disposed on an optical path of said second laser beam and in front of said amorphous silicon film, the second photomask comprising a second pattern having a transparent region and a non-transparent region, wherein the transparent region and the non-transparent region of the first pattern is substantially aligned with the non-transparent region and transparent region of the second pattern, respectively" as substantially recited in Claims 1 and 13.

First of all, as admitted by the Office, Yamazaki teaches irradiating the laser light from the front and the back of a film (see Figures 3, 5 and 6). The present invention, however, teaches that the first photomask is disposed on an optical path of said first laser

Customer No.: 31561
Application No.: 10/709,055
Docket No.: 12404-US-PA

beam and in front of said amorphous silicon film and the second photomask is disposed on an optical path of said second laser beam and in front of said amorphous silicon film. In essence, the first and second laser beams are both irradiating from the front of the amorphous silicon film. Accordingly, Yamazaki at least fails to teach the invention in this regards.

The Office has further conceded that Yamazaki discloses a photomask and only the placing of the mask in the optical path is not taught. Applicants again disagree. Even interpreting the photomask disclosed by Yamazaki from the broadest perspective, the photomask of Yamazaki cannot be remotely construed as comparable to the photomask of the instant application. The only time that Yamazaki ever mentions about the application of a photomask is for the patterning of a resist mask in forming contact holes (see [0128]). The photomasks of the instant application, however, is used for recrystallizing the α -Si film to form a poly-Si film. Further, no where in Yamazaki teaches or suggests the application of two photomasks concurrently. Additionally, the instant application teaches the specific patterns of the two photomasks, in which the first photomask comprises a first pattern having a transparent region and a non-transparent region and the second photomask comprises a second pattern having a transparent region and a non-transparent region, and the transparent region and the non-transparent region of the first pattern is substantially aligned with the non-transparent region and transparent region of the second pattern. Yamazaki is completely silent in this regard.

Applicants respectfully submit that the obviousness test must rely on objective evidence, not mere unsupported opinion or argument. Applicants have provided very specific

Customer No.: 31561
Application No.: 10/709,055
Docket No.: 12404-US-PA

teachings regarding a laser annealing apparatus, for example, a pair of photomasks being used concurrently, the pattern on each photomask, the particular pattern on the first photomask in relationship to the particular pattern on the second photomask, the particular dispositions of the pair of photomasks, etc.. The features and more are all absent from Yamazaki. Applicants believe that the Examiner is arguing out of hindsight, which will tend to render meritorious inventions "obvious".

Even conceding that Yamazaki fails to disclose placing the mask in the optical path, the Office, however, asserts that Tanabe teaches the missing features. Applicant respectfully disagrees with the Examiner's interpretation of the cited art and its application to claims 1 and 13.

Tanabe is directed to a system for forming a crystallized silicon thin film with a reduced trap state density by exposing the silicon thin film to a projected light patterned through a pattern formed on a photomask for uniformizing the light for the expose in a predetermine area on the photomask. Similar to Yamazaki, Tanabe fails to teach or suggest the application of a pair of photomasks, each being placed respectively in the pathways of a first and second laser beams. Tanabe is silent about emitting a second laser beam to a second region of the amorphous silicon film that does substantially un-overlap with the first region, after the amorphous silicon film in the first region is recrystallized. Tanabe definitely fails to teach or suggests that the transparent region and the non-transparent region of the first photomask substantially align with the non-transparent region and transparent region of the second photomask, respectively. Therefore, even if Yamazaki is combined

Customer No.: 31561
Application No.: 10/709,055
Docket No.: 12404-US-PA

with Tanabe, the combinations still fails to teach or suggest all aspects of claims 1 and 13 of the present invention.

Moreover, Applicants submit that neither Yamazaki nor Tanabe is not reasonably pertinent to the particular problem with which Applicants was concerned. As previously discussed, the present invention is directed to annealing an amorphous silicon film to form a poly-Si film. On the other hand, Tanabe is directed to reducing trap state density by light irradiation in order to improve the uniformity of a crystalline silicon film, while Yamazaki teaches forming a crystalline semiconductor film with a larger crystal grain size. As held in MPEP §2141.01(a) and the case law cited thereat, i.e., *In re Oetiker*, neither Tanabe nor Yamazaki can be relied on as a basis for rejection of the claimed invention.

In conclusion, the Office has provided unsupported conjecture for the motivation to combine Yamazaki and Tanabe and for establishing prima facie obviousness in rejecting independent Claims 1 and 13 of the present application. Applicants believe that the Examiner is arguing out of hindsight, finding pieces of the invention within the prior art and assembling them according to the teaching of the present invention. Applicants courteously remind the Office that it is inappropriate to simply engage in a hindsight reconstruction of the claimed invention by using the inventor's own teachings as a guideline to assemble the prior art references in ways that would not have been obvious at the time of the invention.

In view of the foregoing, Applicants contend that the prior art cited by the Examiner, neither alone nor in combination explicitly teaches or implicitly suggests every element of

Customer No.: 31561
Application No.: 10/709,055
Docket No.: 12404-US-PA

claims 1 and 13. Applicants therefore respectfully request the withdrawal of the rejections under 35 U.S.C. § 103(a) of claims 1 and 13 and claims 2-12, 14-17 depending therefrom.

The Office Action rejected claims 6-11 and 13-17 under 35 U.S.C. 103(a), as being unpatentable over Yamazaki and Tanabe in view of Jung. Applicant respectfully traverses the rejections for at least the reasons set forth below.

With regard to the 103 rejections of claims 6-11 by Yamazaki and Tanabe in view of Jung, Applicants respectfully submit that these claims defined over the prior art references for at least the reasons discussed above.

Jung teaches the application of a single mask and the crystallization of the different regions of the substrate is accomplished by moving the mask. Thus, Jung fails to teach the application of two photomasks in the optical paths of different laser beams to crystallize different regions. In brief, Jung teaches away the instant case.

Further, Jung is silent about emitting a second laser beam to a second region of the amorphous silicon film, after the amorphous silicon film in the first region is recrystallized. Jung has also failed to teach or suggest the transparent region and the non-transparent region of the first photomask substantially aligns with the non-transparent region and transparent region of the second photomask, respectively.

Accordingly, even if there were motivation to combine the three references, the combination still fails to teach or suggest each and every element in claims 1 and 13. For at least these reasons, Applicant respectfully submits that independent claims 1 and 13 patentably

Customer No.: 31561
Application No.: 10/709,055
Docket No.: 12404-US-PA

define over the prior art references, and should be allowed. For at least the same reasons, dependent claims 14-17 patently define over the prior art as a matter of law for at least the reason that these dependent claims contain all features of their dependent claims, respectively. Accordingly, favorable consideration and allowance of the present invention and all pending claims are hereby courteously requested.

Page 8 of 9

Customer No.: 31561
Application No.: 10/709,055
Docket No.: 12404-US-PA

CONCLUSION

For at least the foregoing reasons, it is believed that the pending claims are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,


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